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ABSTRACT

This study examined the effectiveness of individually planned learning games used by low-income parents to increase the reading achievement of their children. The subjects were 30 second-grade children in Seattle. Some of the findings were: (1) children who had played learning games with their parents achieved scores that were significantly higher than those of the control group in vocabulary, composite reading, and IQ, and (2) highly significant positive correlations were found for post-vocabulary and composite reading with post-IQ scores. It was concluded that learning games as used by low-income parents increased reading achievement, increased IQ performance, were useful learning tools, and provided techniques for involving parents in the learning process. Significant results were not found relating the learning games and reading comprehension; this may indicate either insufficient time for the games or inadequate content. (DI)

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THE EFFECTIVENESS OF LEARNING GAMES USED BY ECONOMICALLY DISADVANTAGED PARENTS TO INCREASE THE READING ACHIEVEMENT OF THEIR CHILDREN

presented by

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at

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Background and Objectives:

The ultimate objective of this study was to increase the reading achievement of economically disadvantaged children.

Since children from low-income environments score one to two years lower on scholastic achievement tests at the beginning of their school experience than their counterparts from higher income environments (Bereiter, Engelmann, 1966), and whereas this difference becomes a cumulative deficit as the children proceed through school, it was imperative to explore the conditions that could help improve their achievement and reduce the deficit. The specific purpose of this study was to examine the effectiveness of individually planned learning games used by low-income parents to increase the reading achievement of thdr children. The games were constructed by this experimenter to provide the intrinsic motivation (Hunt, 1965) and communication style (Hess, 1965) used in higher-income homes. The language of the learning games was built in as part of the rules of the games. The games are described in detail in Appendix A.

The experimenter selected games as a strategy because of their ability to focus the attention of the players and actively involve them in the process. Games not only motivate the players with attractive, exciting situations but provide a short term, non-threatening condition, according to Abt (1968). Dewey, as early as 1922, considered and used

games as learning toolsand Piaget's (1962) data support the theory that games play an important part in the evolution of intelligence.

Since numerous studies in the past decade have shown positive correlations between parent involvement and the increased achievement of their children, the economically disadvantaged parent was the obvious one to use the learning games to teach his child.

Subjects:

The subjects in this study were 30 children enrolled in second grade classes in the Seattle central area. The school's population was approximately ninety per cent Black. The school records indicated stable, full-time employment for only about one-third of the parents (9) while the rest of the working parents had a variety of low-paying part-time jobs. More than one-third (12) of the families received Aid to Dependent Children funds. Some of these children were in foster homes or were living with relatives.

The Study:

Of those classrooms with no significant difference in mean reading scores (as determined by a "t" test -- .05 on the Metropolitan Achievement Tests), two were randomly selected for the experiment. In Classroom A twenty children were randomly selected and assigned to two groups. The two groups then were randomly designated as Experimental and Internal Control groups. From Classroom B ten children were randomly selected and assigned to the External Control group.

The Experimental Treatment Group received regular school instruction plus the eight specially constructed learning games which were played at home by parent and child over a period of eight weeks (a different game each week).

The Internal Control Group received regular school instruction with the same teacher as the Experimental Group.

The treatment of the External Control Group consisted of regular school instruction with a different teacher in a different classroom.

The specific hypotheses proposed for statistical testing were:

1. There is no significant difference between thepost-test scores in vocabulary, comprehension, composite reading, and I.Q. of children in an Experimental Group who have played learning games with their parents than those of children in the Internal and External Control Groups who have not played learning games with their parents.

2. There is no significant correlation between the post-test scores on the three dependent measures (vocabulary, comprehension, and composite reading) with the post-test I.Q. scores for children inthe a) Experimatal Group, b) Internal Control Group, and c) External Group.

3. There is no signicant difference in treatment effects when scores of children are blocked on high or low I.Q. for achievement in vocabular y, comprehension, composite reading, or I.Q. scores on the P.P.V.T. in the a) Experimental Group, b) Internal Control Group, and c) External Control Group. There is no interaction between I.Q. and treatment.

An alpha level of .05 was set as necessary for rejection of the above hypotheses.

See Table 1 for raw scores on the pre- and post-test measures for the dependent variables -- vocabulary, comprehension, composite reading and I.Q.

Table 1

RAW SCORES ON THE PRE- AND POST-TEST MEASURES FOR THE DEPENDENT VARIABLES--VOCABULARY, COMPREHENSION, COMPOSITE READING, AND I.Q.

	Vocabulary		Comprehension		Composite Reading		I.Q.	
Ss	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Experimental Group								
101	14	25	15	19	29	44	66	76
102	15	27	25	44	40	71	58	61
103	9	18	30	37	39	55	56	57
104	7	27	21	29	28	56	59	60
105	4	15	19	28	23	43	60	69
106	22	30	31	39	53	69	65	68
107	16	21	18	24	34	45	61	65
108	15	25	8	15	23	40	61	62
109	23	29	38	45	61	74	66	73
110	22	30	32	38	54	68	67	74
Internal Control Group								
211	32	28	23	31	55	59	62	64
212	24	17	36	38	60	55	55	61
213	8	15	11	23	19	38	60	58
214	25	27	31	24	56	51	73	77
215	24	29	35	43	59	72	70	69
216	22	29	20	27	42	56	73	70
217	23	22	17	16	40	38	74	66
218	4	8	6	12	10	20	64	65
219	0	10	11	13	19	23	63	66
220	15	20	8	12	23	32	63	60
External Control Group								
331	18	25	14	33	32	58	60	66
332	20	24	31	38	51	52	62	61
333	15	23	23	33	38	56	62	61
334	16	16	21	20	37	36	65	60
335	13	13	20	17	33	30	56	58
336	11	19	13	21	24	40	66	68
337	15	15	29	30	44	45	59	59
338	22	25	32	27	54	52	74	70
339	7	10	20	23	27	33	59	58
340	9	15	16	17	25	32	60	60

See Table 2 for a summary of the means, standard deviations, and standard errors of pre- and post-test measures for these same dependent variables.

Table 2

MEANS, STANDARD DEVIATIONS, AND STANDARD ERROR OF THE MEANS OF PRE- AND POST-TEST MEASURES FOR THE DEPENDENT VARIABLES VOCABULARY, COMPREHENSION, COMPOSITE READING, AND I.Q.

Experimental Group (n = 10)

	Vocabulary		Comprehension		Composite Reading		I.Q.	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
$\bar{X}$	14.70	24.70	23.70	31.80	38.40	56.50	61.90	66.50
S.D.	6.53	5.14	9.14	10.38	13.58	13.13	3.84	6.52
S.E.$\bar{X}$	2.07	1.63	2.89	3.28	4.30	4.15	1.22	2.06
Maximum	23.00	30.00	38.00	45.00	61.00	74.00	67.00	76.00
Minimum	4.00	15.00	8.00	15.00	23.00	40.00	56.00	57.00
Range	19.00	15.00	30.00	30.00	38.00	34.00	11.00	19.00
			Internal Control Group (n = 10)					
$\bar{X}$	18.50	20.50	19.80	23.90	38.30	44.40	65.70	65.60
S.D.	9.19	7.85	11.16	10.99	19.11	16.85	6.43	5.52
S.E.$\bar{X}$	2.91	2.48	3.53	3.48	6.04	5.33	2.03	1.75
Maximum	32.00	29.00	36.00	43.00	60.00	72.00	74.00	77.00
Minimum	4.00	8.00	6.00	12.00	10.00	20.00	55.00	58.00
Range	28.00	21.00	30.00	31.00	50.00	52.00	19.00	19.00
			External Control Group (n = 10)					
$\bar{X}$	14.60	18.50	21.90	25.90	36.50	44.40	62.30	62.10
S.D.	4.74	5.46	6.84	7.39	10.47	11.87	5.06	4.31
S.E.$\bar{X}$	1.50	1.73	2.16	2.34	3.31	3.75	1.60	1.36
Maximum	22.00	25.00	32.00	38.00	54.00	62.00	74.00	70.00
Minimum	7.00	10.00	13.00	17.00	24.00	30.00	56.00	58.00
Range	15.00	15.00	19.00	21.00	30.00	32.00	18.00	12.00

Significance of the Study:

This study provides information regarding the effectiveness of parents as teachers of their own children. It utilizes a planned dialogue imitating the middle-class school language to facilitate an increase in reading achievement. It also provides a system for presenting classroom reading skills to be incorporated into the learning games, and these skills can be adapted easily to individual differences of children. The classroom teacher should find this information very useful to insure mastery by children of particular skills in reading. He also should find that the learning game system is an opportunity for the dispensing of rewards. (Caution must be used to space the rewards at appropriate intervals so that the motivation to learn in regular lessons is not reduced but enhanced.)

Information from the learning games and their use also should provide tutors and parents with insights regarding how to teach and challenge their students.

The application of the principles involved in these learning games should provide many possibilities for use with classroom subjects other than reading.

Limitations:

1. This study was limited to a population of second-grade students in a low-socio-economic central area of Seattle.
2. This study was limited by the restrictions placed on the number of times the parent and child were to play the game. A ground rule was established that each game was to be

played at least three and not more than five times per day for six days during the week.

3. This study was limited by the variability between the home environments in which the games were played.
4. This study was limited by the parent variable, although an effort to obtain random selection of parents was made by the random selection of students.

Materials:

The materials consisted of eight learning games based upon the current reading skill needs of the child as identified by individual reading inventories. The original game ideas were developed in a remedial reading situation where a more active involvement was needed to challenge the child.

The games in this study stressed a variety of skills such as: attending, recognizing words, rhyming, sentence creation, expression in oral reading, comprehension skills, etc.

In order to attract and hold the attention of the children, dice and pennies plus colorful boards and objects were used. Tally sheets (Appendix D) were distributed and used by the parents to report scores and indicate successes and/or difficulties plus any other information they felt was pertinent.

Instruments:

Diagnostic inventories were used to gather information on specific skills needed for the games. These inventories consisted of the Botel Reading Inventory, the Dolch Basic Word List, as well as the La Pray Placement Test for Reading, and the current word checks from the daily lessons conducted by the classroom teachers. These inventories provided a phonetic analysis, a beginning sight vocabulary, and a graded vocabulary placement.

The pre- and post-tests used for reading achievement were two forms of the Metropolitan Achievement Test, Primary Battery, which includes vocabulary, reading comprehension, and composite reading scores. (This test is regularly used by the Seattle Public Schools to measure progress in reading.)

The measure for I.Q. pre- and post-tests were two forms of the Peabody Picture Vocabulary Test. This test was used because of the limited time required for administration and its correlation with the Binet and the Wechsler Intelligence Scale for Childr--

Design:

The experimental design used for this study was a randomized group, pre-test post-test, two control group design based upon that of Campbell and Stanley (1963).

RANDOMIZED GROUP, PRE-TEST POST-TEST, TWO CONTROL GROUP DESIGN*
(Campbell and Stanley, 1963)

R	Experimental	O_1	x	O_2
R	Int. Control	O_3	x	O_4
R	Ext. Control	O_5	x	O_6

* Modified to permit the use of two control groups. O represents pre- or post-test measures, x represents the treatment condition, and R represents random assignments.

The statistical treatment of this study had three major analyses: 1) four separate one-way analyses of covariance to determine the effect of the treatment upon each of the four dependent variables; 2) three separate Pearson product-moment correlation tests for the possible correlation of the dependent variables with I.Q. scores; and 3) a 3 x 2 analysis of covariance for each of the three dependent variables after subjects were divided into high and low I.Q. groups based on the pre-test scores of the P.P.V.T. to test for the effects of I.Q. on test performance and the interaction of treatment effect and I.Q.

Procedure:

The pre-tests of reading achievement (Metropolitan Achievement Tests, Form C) were given to all three treatment groups. Individual I.Q. tests (Peabody Picture Vocabulary Tests) were administered individually by a testor not connected with this study in the week prior to the beginning of the experiment. Following this testing, children were randomly assigned to three treatment groups.

After this random assignment to groups, the parents of children in the Experimental Group were contacted by phone for permission to include their children in the study. The investigator explained the purpose and conditions of the study to the parents and asked them to cooperate in the games and with the staff members. Parents were informed that following some initial testing of the reading skills of their children, they would be invited to a group meeting to receive specific information about the learning games.

Following parental approval and consent, the investigator administered to the children diagnostic tools (identified under Instruments) in order to establish the specific reading needs to be included in the first games. Parents then received invitations to the group information meeting to become informed in more detail about the purpose of the study, the skills involved, the use of the games, and about the experimenter and staff members. The investigator distributed tally sheets for the game results and explained the responsibility for keeping the records. (See Appendix D for a sample tally sheet.)

Thereafter, one meeting a week was held to review and discuss reactions given on the tally sheet to the previous game. Not more than half of the parents were able to meet at the school at the appointed time. Home visits or visits at some other preferred place had to be made. At the group meetings parents became familiar with the new game by playing it with other parents or staff members. This enabled them to become familiar with the rules and the dialogue necessary to play the game. Parent-Child game sessions averaged 30 minutes. The games were to be played 3 times each day for six days only. Results were tallied daily by parents and feedback on each game was tabulated weekly.

Finally, following completion of the eight weeks of games, the staff administered the post-tests of the Metropolitan Reading Achievement Tests, Form B. The staff then administered the individual I.Q. tests, the Peabody Picture Vocabulary Tests. Data were recorded and statistically treated as previously outlined. An evaluation meeting involving parents, the experimenter, and staff was video-taped. In addition to showing them playing the games together, they were asked to discuss their impressions of the games as used in the home. The experimenter wanted this information for replication of the study and possible improvement of the games and the experiment.

Major Findings:

The major findings of this study were:

Hypothesis I:

The children in the Experimental Treatment who had played learning games with their parents achieved scores that resulted in significant differences for vocabulary, composite reading, and I.Q. The treatment did not result, however, in significant differences for comprehension scores.

Hypothesis II:

Highly significant positive correlations were found for post-vocabulary and composite reading with post-I.Q. scores in the Experimental Group. Positive correlations also were found for these same two variables in the External Control Group.

Hypothesis III:

The main treatment effects for vocabulary, composite reading, and I.Q. resulted in significant differences favoring the Experimental Group when divided by high and low I.Q. However, the treatment effect for comprehension and I.Q. did not result in significant differences.

The main effects of I.Q. did not result in significant differences for any of the dependent variables.

The interaction effect of treatment and I.Q. did not reveal significant differences, although a trend toward interaction was noted.

When the means of the sub-groups were examined separately, the Experimental high I.Q. sub-group did significantly better on the variable I.Q. than all other sub-groups. The Experimental low I.Q. sub-groups did better (but not significantly

so) than all other sub-groups on vocabulary and composite reading.

Conclusions:

The learning games as used by economically-disadvantaged parents to increase the reading achievement of their children were beneficial and stimulated reading achievement and increased I.Q. performance. They also appeared to offer useful tools for learning. The learning games provide techniques for the school to involve the parent in the learning process wherein the activity is meaningful and provides successful results. The parents can be easily instructed and will readily feel a sense of contributing to the accomplishments of their children. The tasks are not only specific, but easily measured.

The high positive correlations of vocabulary and composite reading with I.Q. are of importance because increasing the achievement scores for vocabulary and composite reading will result in increasing the I.Q. score.

The treatment was successful for the Experimental Group of children in both high and low I.Q. groups. Differential effects can be found for high and low groups and can provide diagnostic information for the school.

The significant results reported above suggest that the learning games provided important information and practice at needed skills in vocabulary and composite reading. However, the lack of significant differences for comprehension may indicate either insufficient time for the games or inadequate content.

The high correlations for post-vocabulary and composite reading with post-I.Q. scores might be explained by the similarities of test content. Similar correlations in the control groups, however, seem to indicate an uncontrolled teacher variable.

The learning games seem to be an effective technique for raising the achievement level of economically-disadvantaged children with high or low I.Q. However, since the low I.Q. sub-group did better than the high I.Q. sub-group, speculation could be made that the low I.Q. group responded better to the one-to-one contact during the games. This could provide important diagnostic information. The lack of significant differences for the treatment effect for comprehension may be due to the more complicated comprehension questions on the Metropolitan Achievement Tests than the ones in the learning games. Also, the comprehension skills might need more practice time to result in significant differences than was provided in the learning games in this study.

Recommendations:

The following recommendations are made for further research:

1. Although the results of this study were significant for the main treatment effect, one factor that was not analyzed sufficiently was the parent as the main variable. Is it possible that the teacher in the regular class could have had the same results? Thus, future research should use the parent as a major independent variable and the game be separated. The game might be used with a tutor, a classroom teacher, or another child.

2. Since the findings for comprehension were not significant as a result of the main treatment effects, future studies might give more time to this variable and redesign some of the games to incorporate paragraphs requiring comprehension skills. This might more closely approximate the skills required on the Metropolitan Achievement Tests for paragraph understanding.

3. Since sex was not a variable in this study, a replication should include the possible male-female relationship of the child and the tutor to increase reading achievement.

4. Whereas this study dealt only with the field of reading, a future study might incorporate other subject skills into the games for learning.

5. While the learning games were a regularly scheduled event in this study, replication might consider using the learning games with other children as a reward for classroom achievement. The game would provide additional practice of the skills.

6. Although notes were kept of the meetings with parents regarding the learning-game sessions with their children, a future study might include taping the parent and child playing the games to examine the instructional style of the parent. This information could be used for further study and as feedback to parents to help them improve their instructional ability.

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Appendix A

Description of Learning Games

General Objectives:

1. Speak in complete sentences.
2. Follow directions, simple to complex.
3. Attend to tasks.

Note: Specific skills are identified after each game.

Game 1. "Seattle" (stresses attending skills, recognizing and saying words and matching them)

This is a matching game with 36 cards, 18 different words (each appears on two cards). The cards are shuffled, placed upside down, and players take turns trying to turn up a matched pair.

Game 2. "San Francisco" (stresses attending skills, recognizing and saying words plus matching rhyming sounds)

This is a sound rhyming game with 36 cards and 36 different words (the words must sound alike to be rhyming words). The cards are shuffled, placed upside down, and players take turns trying to turn up words that sound alike to make a pair.

Game 3. "Los Angeles" (stresses oral reading of simple sentences and comprehension through following directions)

This is a trail game (12 x 18 board) made up of numbered steps. A deck of 30 numbered cards, each containing directional sentences to be read and followed by the child, must be carefully followed to complete the trail.

Game 4. "Denver" (stresses oral reading of more complicated sentences with phrases as well as comprehension through following directions)

Same as Game 3 procedure, but contains more complicated sentences.

Game 5. "Chicago" (stresses auditory and visual matching with printing)

This is "lingo-bingo" in which each player has a 5 x 8 card with four rows of words. A deck of 30 cards have words that may or may not be on the "lingo-bingo" board. Quick word recognition is necessary to cover words in a row to win.

Game 6. "Detroit" (stresses creation of meaningful sentences from a pool of words)

This game is made up of two decks of cards, one with the beginnings of sentences and the other with the endings to the sentences. The cards for each row are shuffled and placed upside down in each row. The child turns over a card from each row, trying to make a meaningful sentence.

Game 7. "New York" (stresses careful selection of words and appropriate punctuation to make a variety of sentences)

The sentence-punctuation game is made up of 36 cards to be placed in six rows as specified on the back. Row 1 is for capital letters. Rows 2, 3, 4, and 5 have a noun, pronoun, adjective, verb, etc. Row 6 has a period, question mark, or exclamation point. Dice are rolled to determine which row's cards are to be selected. Two completed sentences win the game.

Game 8. "Washington, D.C." (stresses the use of compound sentences with challenging vocabulary words and comprehension of directions)

This game uses an 18 x 30 map with a triple trail (highway, train track, and airway) going to Washington, D.C., via car, train, and plane through and over various cities. A deck of 30 cards is shuffled, placed in a pile, and each player takes a turn by taking the top card and following a trail designated by the sentence on the card. The first player to arrive in Washington, D.C. wins.

Appendix C

Gain Scores from the Pre- and Post-Test Measures for the Dependent Variables -- Vocabulary, Comprehension, Composite Reading, and I.Q.*

Group	Ss	Vocabulary	Comprehension	Composite Reading	I.Q.
Experimental	101	11	4	15	10
	102	12	19	31	3
	103	9	7	16	1
	104	20	8	28	1
	105	11	9	20	9
	106	8	8	16	3
	107	5	6	11	4
	108	10	7	17	1
	109	6	7	13	7
	110	8	6	14	7
Internal Control	211	-4	8	4	2
	212	-7	2	-5	6
	213	7	12	19	-2
	214	2	-7	-5	4
	215	5	8	13	-1
	216	7	7	14	-3
	217	-1	-1	-2	-8
	218	4	6	10	1
	219	2	2	4	3
	220	5	4	9	-3
External Control	331	7	19	26	6
	332	4	7	11	-1
	333	8	10	18	-1
	334	0	-1	-1	-1
	335	0	-3	-3	2
	336	8	8	16	2
	337	0	1	1	0
	338	3	-5	-2	-4
	339	3	3	6	-1
	340	6	1	7	0

*Metropolitan Achievement Tests
Peabody Picture Vocabulary Test

Appendix D

Tally Sheet

Week No. _____ Name _____

	Parent	Child	Parent	Child	Parent	Child
Monday						
Tuesday						
Wednesday						
Thursday						
Friday						
Saturday						
Sunday						

Notes: